DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 8, 2009 has been entered.

This Office Action is in response to Applicant's request for continued examination (RCE) filed September 8, 2009, and amendment and response to the Final Office Action (mailed May 7, 2009), filed September 8, 2009.

Claims 1, 2, and 25 are pending and are examined on the merits herein.

Priority

As set forth in the office action mailed May 7, 2009, the filing date of claims 1, 2, and 25 is deemed to be the instant filing date, June 9, 2004.

The following rejection is modified from the previous rejection:

Claim Rejections - 35 USC § 103

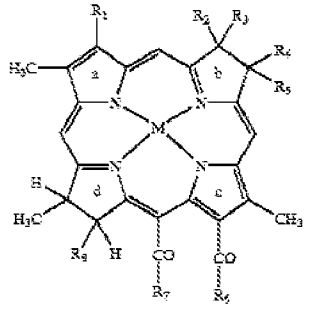
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

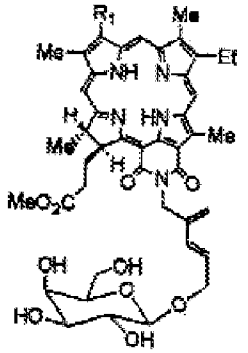
This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pandey et al. (US 2002/0198157, December 26, 2002) in view of Tidmarsh et al. (US 6,989,140 B2, January 24, 2006, previously published as US 2003/0152518, August 14, 2003, of record) and Fukuzumi et al. (J. Phys. Chem. A 2002, 106, 5105-5113, of record).

Pandey teaches purpurin-carbohydrate conjugates useful for photodynamic therapy [see abstract]. Oligosaccharides play essential roles in molecular recognition, so porphyrins with sugar moieties can be used for specific cellular targets [0004]. Most preferred compounds are of the following formula [0014], wherein R_6 and R_7 together are $=NR_{11}$, wherein R_{11} contains a mono or polysaccharide moiety which can be linked through an intermediate group containing one or more of alkylene, ether, amide, or ester linkage [0015-0017].



A compound wherein R_6 and R_7 together are $=NR_{11}$, wherein R_{11} contains a monosaccharide linked through an alkylene intermediate group is shown below [Figure 17, 2b]:



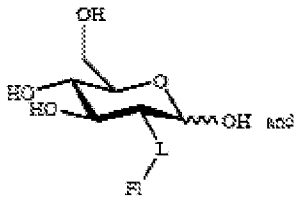
2b

Galectin-1 and galectin-3 are expressed in epithelial tumors [0006] and have a pronounced specificity for Gal(β1-4)- and Gal(β1-3)GlcNAc sequences [0008], so compounds containing a galactose or lactose saccharide group are preferred [0016] in order to obtain Gal-1 recognizing agents [0009].

Pandey teaches monosaccharide conjugates generally, but not 2-deoxyglucose conjugates specifically, and does not teach the linker shown in the elected species.

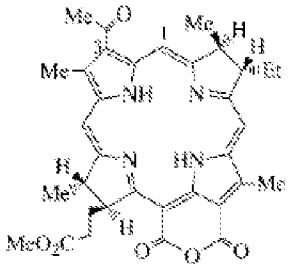
Tidmarsh teaches methods for cancer and pre-cancer detection by increased uptake of deoxyglucose conjugates in cancerous and pre-cancerous cells [see abstract]. Cancerous and pre-cancerous cells exhibit an enhanced rate of uptake of glucose fluorophore conjugates [column 4, lines 38-41]. The conjugates can be derived by chemically modifying 2-deoxyglucose, which is taken into and accumulated in cancerous cells and pre-cancerous cells preferentially compared to normal cells [column 4, lines 42-49]. Preferably, the fluorophore fluoresces upon excitation of light in the range of about 500 nm to 900 nm [column 6, lines 24-31]. Preferred fluorophores include macrocyclic fluorescent dye compounds [column 8, lines 1-5]. The fluorophores can be attached to the deoxyglucose using, for example, a fluorophore isothiocyanate [column 9, lines 64-67] or a bifunctional linker group derived from $-NH_2$, $NHNH_2$, $-ONH_2$, $-NHC=(O)NHNH_2$, -OH, $-CO_2H$, or –SH [column 10, lines 26-45]. In one embodiment, the fluorophore has an isothiocyanate functional group that is used to attach the fluorophore to an amino group present on glucosamine to form a thiourea linkage [column 20, lines 47-56]. The fluorophore deoxyglucose conjugate can have the formula shown below, where L is a linker group and Fl is a fluorophore [column 15, Ia]:

Ia

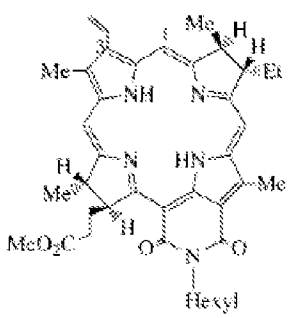


The conjugates can be administered in forms suitable for oral administration or parenteral administration and can include pharmaceutical carriers [column 17, lines 13-49].

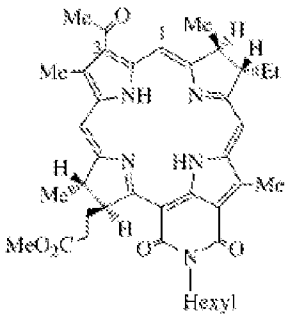
Fukuzumi teaches that the following stable bacteriochlorin compounds [page 5108, Chart 1] are highly promising for potential use in photodynamic therapy due to long-wavelength absorption [see abstract]. Conversion of the five-membered isocyclic ring present in chlorophyll *a* can be converted into a fused six-member isoimide or imide ring, extending the long-wavelength absorptions [page 5105, last paragraph]. Compounds containing the six-member imide ring were more stable in vivo than those bearing a fused anhydride or isoimide ring system [page 5106, first paragraph].



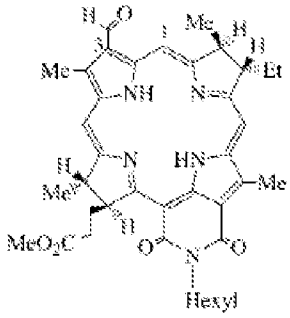
1



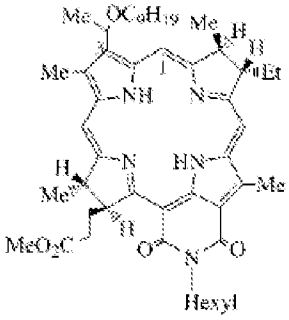
2



3



4



5

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pandey's purpurin-carbohydrate conjugates to include 2-deoxyglucose as the carbohydrate and to include an isothiocyanate linker group, as taught by Tidmarsh. Pandey's preferred compounds include a galactose moiety in order to target cancer cells which have a pronounced specificity for Gal(β1-4)- and Gal(β1-3)GlcNAc sequences. Tidmarsh teaches that fluorophore-carbohydate conjugates which contain the 2-deoxyglucose moiety can be used to target cancerous and pre-cancerous cells which exhibit an enhanced rate of uptake of glucose fluorophore conjugates. Thus, both Pandey and Tidmarsh are drawn to the use of carbohydrate conjugates to target fluorophores to cancer cells. Pandey and Fukuzumi teach that the elected species purpurin has desirable properties for PDT, including properties required by Tidmarsh. Thus, the skilled artisan would understand that employing a 2-deoxyglucose moiety in Pandey's conjugates would result in a conjugate which could be used to target cancerous and pre-cancerous cells, as taught by Tidmarsh. The claimed linker is also taught by Tidmarsh, so the skilled artisan could envision using that linker. The examiner was unable to locate any data in the instant specification to suggest that the isothiocyanate linker is critical or provides any unexpected results.

Response to Arguments

Applicant argues that Tidmarsh teaches a large number of linkers, and that there is no guidance for the skilled artisan to decide which linker to use. Tidmarsh specifically teaches embodiments which include the isothiocyanate linker to form a thiourea bond

between the fluorophore and glucosamine, which may or may not include an alkyl spacer. This teaching is part of a very limited group of preferred embodiments that include isocyanate, isothiocyanate, or carboxylic acid linkages [see column 20, lines 47-56]. Thus, the skilled artisan would have sufficient guidance to choose one of those. Tidmarsh also teaches that the length of the linker arm can be varied [column 14, lines 40-44]. As set forth above, the linker is not seen to be a critical feature in the absence of unexpected results.

Applicant's argument with respect to the placement of the linker group is moot in view of the Pandey reference.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAYLA BLAND whose telephone number is (571)272-9572. The examiner can normally be reached on Monday - Friday, 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anna Jiang can be reached on (571) 272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Layla Bland/
Examiner, Art Unit 1623

/Shaojia Anna Jiang/
Supervisory Patent Examiner
Art Unit 1623